

WHAT IS CLAIMED IS:

1. A method of minimizing collisions in a CSMA/CA wireless data communication system having first and second transceivers and an array of available transmit start time slots, including transmitting and receiving data, the method comprising the steps of:

allocating a first start time slot list and a second start time slot list, each list comprising at least one time slot further comprising a subset of the available transmit start time slots during which the first and second transceivers may begin to transmit;

transmitting from the first transceiver beginning only during the at least one start time slot indicated by the first start time slot list; and

transmitting from the second transceiver beginning only during the at least one start time slot indicated by the second start time slot list.

2. The method of claim 1 wherein the step of allocating further comprises the step of: creating disjoint first and second start time slot lists.

3. The method of claim 1 or claim 2 wherein the first transceiver is an access point and the second transceiver is a client.

4. The method of claim 1 wherein the step of allocating further comprises the step of: expanding at least one of the array of available transmit start time slots, the first start time slot list and the second start time slot list responsive to collision detection.

5. The method of claim 4 wherein the step of expanding comprises the step of: replicating at least one of the array of available transmit start time slots, the first start time slot list and the second start time slot list.

6. The method of claim 4 wherein the step of expanding comprises the step of:
creating a larger start time slot list having proportionately larger pools of start time slots,
each pool associated with a class of transmission.

7. A method of minimizing collisions in a CSMA/CA wireless data communication system having allocated transmit start time slots, including transmitting and receiving data, the method comprising the steps of:

sensing the presence of a client desirous of communication with an access point;
allocating a start time slot list having at least one unique start time slot during which the client may begin transmitting;
transmitting the start time slot list to the client;
transmitting from the client to the access point beginning only during the start time slots indicated by the start time slot list.

8. The method of claim 7 wherein the step of allocating further comprises the step of:
expanding the start time slot list responsive to one of the group of collision detection and sensed client count.

9. The method of claim 8 wherein the step of expanding comprises the step of:
replicating the start time slot list.

10. The method of claim 8 wherein the step of expanding comprises the step of:
creating a larger start time slot list having proportionately larger pools of start time slots,
each pool associated with a class of transmission.

11. The method of claim 7, wherein the sensing step comprises the steps of:

receiving an association request from a client;
acknowledging the association request from a client.

12. The method of claim 7 wherein the allocating step comprises the steps of:
measuring a traffic value for the client;
assigning the start time slots based on the traffic value.

13. The method of claim 7 wherein allocating comprises the step of:
assigning, for the client, at least one pair of a high-priority start time slot and a low-priority start time slot substantially equally displaced in time from a center start time slot.

14. The method of claim 7 wherein allocating comprises the steps of:
determining a class of data for transmission;
assigning, for the client, the start time slots based on a pool of start time slots associated with the class of data for transmission.

15. The method of claim 7 wherein allocating comprises the steps of:
receiving a priority value from the client; and
assigning the allocated transmit time slots based on the priority value.

16. The method of claims 8, 9, 10, 11, 12, 13, 14 or 15 wherein the step of transmitting from the client comprises the steps of:
selecting an entry from the start time slot list based on a randomizing function;
transmitting from the client to the access point only during the selected start time slot.

17. The method of claim 16 wherein selecting an entry from the start time slot list comprises:

selecting an entry from the start time slot list based on a randomizing function with a substantially equal likelihood of selection for any element of the start time slot list.

18. A method of minimizing collisions in a shared data communication medium having allocated transmit start time slots, including transmitting and receiving data, the method comprising the steps of:

sensing the presence of a client desirous of communication with an access point;

allocating a start time slot list having, for the client, a high-priority time slot and a low-priority time slot substantially equally displaced in time from a center time slot;

transmitting the start time slot list to the client; and

transmitting from the client to the access point beginning only during the start time slots indicated by the start time slot list.

19. The method of claim 18 wherein transmitting from the client comprises the steps of:

selecting the high-priority start time slot or low-priority start time slot based on a randomizing function; and

transmitting from the client to the access point beginning only during the selected start time slot.

20. A system for minimizing collisions in a CSMA/CA wireless data communication system having allocated transmit start time slots, including an access point and a client, the system comprising

a client sensor for detecting the presence of a client desirous of communication with an access point;

a start time slot allocator for allocating a start time slot list having at least one unique start time slot during which the client may begin to transmit;

an access point transmitter for transmitting the start time slot list to a client receiver; and

a client transmitter enabled to begin transmission only during the start time slots indicated by the start time slot list.

21. The system of claim 20, wherein the client sensor comprises

an access point receiver receiving an association request from a client.

22. The system of claim 20 wherein the time slot allocator comprises:

a traffic analyzer generating a traffic value for the client; and

a start time slot selector responsive to a traffic value generating a start time slot list having at least one unique start time slot during which the client may begin to transmit.

23. The system of claim 22 wherein the traffic value comprises:

one of the group of a class of data for transmission and a priority value,

24. The system of claim 20 wherein the start time slot allocator comprises:

a start time slot generator generating, for the client, a start time slot list having at least one pair of a high-priority time slot and a low-priority start time slot substantially equally displaced in time from a center start time slot.

25. The system of claims 22 wherein the client transmitter further comprises:

a start time slot selector for choosing an entry from the start time slot list based on a randomizing function; and

a transmitter gate permitting the client transmitter to begin operation only during the time associated with the chosen time slot.

26. The system of claim 20 wherein the start time slot allocator comprises:

- an access point receiver for receiving a priority value at least one client; and
- a start time slot selector for choosing at least one entry from the start time slot list based on the priority value.

27. A system for minimizing collisions in a CSMA/CA shared data communication medium having allocated transmit start time slots, including transmitting and receiving data, the system comprising:

- a client sensor for detecting the presence of a client desirous of communication with an access point;
- a start time slot allocator for allocating, for at least one client, a time slot list having a high-priority time slot and a low-priority time slot substantially equally displaced in time from a center time slot;
- an access point transmitter for transmitting the start time slot list to a client receiver; and
- a client transmitter enabled to begin transmission only during the start time slots indicated by the start time slot list.

28. The system of claim 27 wherein the client transmitter further comprises:

- a start time slot selector for choosing an entry from the start time slot list based on a randomizing function;
- a transmitter gate permitting the client transmitter to begin transmission only during the time associated with the chosen start time slot.

29. A system having an access point and at least one client cooperatively minimizing transmission collisions in a CSMA/CA shared communications medium, the system comprising:

an access point controller disposed to receive a transmission from a client transmitter and operatively connected to a start time slot allocator, the start time slot allocator generating a start time slot list;

an access point transmitter disposed to transmit the start time slot list to the client;

a client receiver disposed to receive and store the start time slot list; and

a client transmitter disposed to begin transmission only during a start time slot stored in the start time slot list.

30. The system of claim 29 wherein the transmission from the client transmitter is an association request.

31. The system of claim 29 wherein the start time slot allocator is further disposed to receive traffic data from a traffic analyzer, the allocator being responsive to the traffic data.

32. The system of claim 29 wherein the start time slot allocator generates, for at least one start time slot list, at least one pair of a high-priority start time slot and a low-priority start time slot substantially equally displaced in time from a center start time slot.

33. The system of claim 29 wherein the start time slot list is disposed to receive a randomized selection signal, the randomized selection signal operatively selecting one start time slot from the start time slot list.

34. The system of claim 33 wherein the randomized selection signal selects start time slots with a substantially equal probability.

35. The system of claim 29 wherein:

the controller is disposed to receive from the access point receiver a fixed priority value, the fixed priority value being operatively coupled to the client transmitter; and

the start time slot allocator is disposed to receive, and is responsive to, the fixed priority value.

36. A system for minimizing transmission collisions in a CSMA/CA wireless data communication network, having first and second transceivers and an array of available transmit start time slots, the system comprising:

a first transmit start time slot list having a subset of the available transmit start time slots;

a second transmit start time slot list having a subset of the available transmit start time slots;

a first transmitter coupled to the first transceiver and responsive to the first transmit start time slot list, wherein the first transmitter begins transmission only during start time slots in the first transmit start time slot list; and

a second transmitter coupled to the second transceiver and responsive to the second transmit start time slot list, wherein the second transmitter begins transmission only during start time slots in the second transmit start time slot list.

37. The system of claim 36 wherein the first and second transmit start time slot lists are disjoint.

38. The system of claim 36 or 37 wherein the first transceiver is an access point and the second transceiver is a client.